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EXAMINER

KUBELIK, ANNE R

ART UNIT	PAPER NUMBER
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1638

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,906

Applicant(s)

ARNAUT ET AL.

Examiner

Anne R. Kubelik

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 57-78 is/are pending in the application.
- 4a) Of the above claim(s) 59-61 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 57, 58 and 62-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9/23. 6) ☐ Other:

DETAILED ACTION

1. Applicant's election with traverse of group I and SEQ ID NO:2 in the response filed 12 November 2003 is acknowledged. The traversal of the restriction among the sequences is on the ground(s) that each sequence is related to SEQ ID NO:2 as SEQ ID NO:8 has insertion of a single amino acid relative to SEQ ID NO:2 and SEQ ID NOs:7 and 9 are nucleotide sequences encoding SEQ ID NO:8. This is not found persuasive because a thorough examination of each sequence requires individual searches on each of the sequences against all the databases at the PTO. Database size and resource allocations at the PTO are such that examination of more than one sequence on the merits in the instant application would present a severe burden on PTO resources.

The requirement is still deemed proper and is therefore made FINAL.

Claims 59-61 are withdrawn from consideration.

2. The disclosure is objected to because it contains embedded hyperlinks and/or other forms of browser-executable code. See pg 15, line 9. Applicant is required to delete the embedded hyperlinks and/or other forms of browser-executable code. See MPEP § 608.01.

3. The abstract is not descriptive of the instant invention, which is a nucleic acid encoding Cry2Ae, plants and plant cells transformed with the nucleic acid and a process for using the nucleic acid to render plants resistant to lepidopteran pests. A new abstract is required that is clearly indicative of the invention to which the claims are directed. The abstract of the disclosure should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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4. The title of the invention is not descriptive of the instant invention, as above. A new title is required that is clearly indicative of the invention to which the claims are directed. Note that titles can be up to 500 characters long.

5. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification of in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (*i.e.*, continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

Claim Objections

6. Claims 69, 71 and 73 are objected to because of the following informalities:

In claim 69, line 2, “comprising” should be replaced with --wherein the method comprises--.

Claim 71, has an improper article before “leader” in part (b).

Claim 73 has an improper article before “3” in line 2.

7. Claim 70 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 69.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP

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§ 706.03(k). The steps of both methods are identical; thus the process would inherently render a plant resistant to *Helicoverpa armigera*, *Anticarsia gemmatilis*, *Sesamia nonagrioides*, *S. inferens*, *Chilo suppressalis*, *C. partellus*, *Scirpophaga incertulas*, *S. innotata*, *Cnaphalocrocis medinalis*, *Marasmia patnalis*, *M. exigua*, and *M. ruralis*.

8. Claims 62 and 77 are objected to for being dependent upon non-elected claims.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 57, 62-74 and 76-77 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Neither the instant specification nor the originally filed claims appear to provide support for the phrase “between amino acid position 1 and amino acid position 625 to amino acid position 632” in claim 57. Thus, such a phrase constitutes NEW MATTER. In response to this rejection, Applicant is required to point to support for the phrase or to cancel the new matter.

11. Claims 58, 62 and 77 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the

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relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Neither the instant specification nor the originally filed claims appear to provide support for the phrase “between amino acid position 1 and amino acid position 50 to amino acid position 632” in claim 58. Thus, such a phrase constitutes NEW MATTER. In response to this rejection, Applicant is required to point to support for the phrase or to cancel the new matter.

12. Claims 57-58 and 62-78 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are broadly drawn to a multitude of nucleic acids that encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2. In contrast, the specification only describes a nucleic acid that encodes an insecticidal Cry2Ae protein consisting of SEQ ID NO:2. Applicant does not describe other nucleic acids encompassed by the claims, and the structural features that distinguish all such nucleic acids from other nucleic acids are not provided.

Hence, Applicant has not, in fact, described nucleic acids that encode that encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2 within the full scope of the claims, and the specification fails to provide an adequate written description of the claimed invention.

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Therefore, given the lack of written description in the specification with regard to the structural and physical characteristics of the claimed compositions, it is not clear that Applicant was in possession of the genus claimed at the time this application was filed.

See *Univ. of California v. Eli Lilly*, 119 F.3d 1559, 43 USPQ 2d 1398 (Fed. Cir. 1997) at pg 1406:

... A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to the members of the genus, which features constitute a substantial portion of the genus.

13. Claims 57-58 and 62-78 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for nucleic acids that encode SEQ ID NO:2, chimeric genes comprising them, plants and plant cells transformed with them, and methods of using them to render a plant resistant to specific lepidopteran pests, does not reasonably provide enablement for nucleic acids that encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2, chimeric genes comprising them, plants and plant cells transformed with them, and methods of using them to render a plant resistant to specific lepidopteran pests. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claims are broadly drawn to a multitude of nucleic acids that encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2, chimeric genes comprising them, plants and plant cells transformed with them, and methods of using them to render a plant resistant to specific lepidopteran pests.

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The instant specification, however, only provides discusses toxicity assays of two bacterial strains on various lepidopteran pests (examples 1-2), isolation from the strains of cry2A genes using unspecified primers and toxicity assays of the proteins (example 3) and prophetic expression of the genes in plants (example 4). SEQ ID NO:1 encodes the 632 amino acid long Cry2Ae protein of SEQ ID NO:2.

The instant specification fails to provide guidance for nucleic acids that encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2.

The specification, on pg 7, lines 22-27 teach that the first 50 amino acids of SEQ ID NO:2 do not have insecticidal activity; thus, nucleic acids encoding amino acids 1-50 of SEQ ID NO:2 could not encode an insecticidal Cry2Ae protein. The specification also teaches that little can be deleted at the C-terminus of the protein. Thus, few, if any insecticidally effective fragments of SEQ ID NO:2 or amino acids 1 to 50-632 of SEQ ID NO:2 would even exist.

As the specification does not describe the transformation of any plant with a nucleic acids that encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2, undue trial and error experimentation would be required to screen through the myriad of nucleic acids encompassed by the claims and plants transformed therewith, to identify those with pest resistance, if such plants are even obtainable.

Given the claim breath and lack of guidance as discussed above, undue experimentation would have been required by one skilled in the art to develop and evaluate nucleic acids that

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encode insecticidal Cry2Ae proteins consisting of amino acids 1 to 50-632 of SEQ ID NO:2 or that encode insecticidally effective fragments of SEQ ID NO:2

14. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

15. Claims 62, 64, 66, 68 and 71-78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Dependent claims are included in all rejections.

It is unclear in claim 62 if the protein is modified so that Met-Asp or Met-Ala is attached to the being of SEQ ID NO:2 or is Asp or Ala is inserted after the Met that starts SEQ ID NO:2. If that latter, the claim is drawn to a non-elected sequence. If the former, it is suggested that the claim be amended to state that the DNA further comprises a Met-Asp or Met-Ala dipeptide at its N-terminal end. In both cases, the claim is broader than claim 58, upon which it depends, because DNA of claim 58 encodes a protein that consists of the specified range of SEQ ID NO:2 and thus cannot be broader than that.

It is unclear in claim 64 where the DNA encoding a targeting or transit peptide is located relative to the DNA sequence and the promoter.

It is unclear in claim 71 if the components in parts (a)-(c) are present in any order, or in operably linkage.

Claim 71, part (a) is indefinite in its recitation of "derived". It is unclear how the promoters differ from the native promoters.

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Claim 71 is indefinite in its recitation of “A chimeric gene comprising ... a leader sequence”. Is this leader sequence translated or untranslated. If translated, the claim is improper because DNA does not encode protein. If untranslated, the claim should be amended to so specify.

It is unclear in claim 72 where the DNA encoding the TpssuAt transit peptide is located relative to the promoter, the leader sequence, and the DNA. It is also unclear for what “TpssuAt” is an abbreviation.

It is unclear in claim 73 where the transcript termination and polyadenylation region is located relative to the other components of the chimeric gene.

Claim 74 lacks antecedent basis for the limitation “the chimeric gene of claim 57”. Should the claim have been dependent upon one of claims 71-72? If so, it is unclear where the DNA sequence encoding the protein of SEQ ID NO:2 is located relative to the other components of the chimeric gene. If not, it is unclear if the DNA sequence encoding a protein consisting of amino acids 1 to 625-632 is also under control of the promoter.

It is unclear in claim 75 if the second chimeric gene has a promoter.

Claim 75, line 4 and claim 78, line 2, are indefinite in their recitation of “derived”. It is unclear how the toxic fragments or hybrids derived from a Cry1F protein differ from the Cry1F protein.

It is unclear in claim 77, line 2, which protein, of the many that can be encoded by any DNA, is the one intended.

In claim 78, it is suggested that instead of reciting that toxic fragments or hybrids derived from Cry1F comprise Cry1A-Cry1F protein, that the claim instead state that the second chimeric gene encode a Cry1A-Cry1F protein.

Claim Rejections - 35 USC § 102

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

17. Claims 57-58, 63-70, 74 and 76-77 are rejected under 35 U.S.C. 102(e) as being anticipated by Baum et al (US Patent 6,593,293, filed September 1999) taken with the evidence of Datla et al (1997, BioTechnol. Ann. Rev. 3:269-296).

Baum et al teach a nucleic acid, SEQ ID NO:1, that encodes the instant SEQ ID NO:2. Baum et al also teach the expression of the DNA in plants, including corn and cotton, in chimeric gene constructs behind plant promoters, including the CaMV 35S, the FMV 35S, mannopine synthase, and the SSU promoters, a 5' leader sequence, and with and without chloroplast, vacuolar or secretion transit peptides, and operably linked to a 3' terminator (column 12, lines 30-43; column 23, lines 1-20; column 57, line 50, to column 63, line 22). The plants would inherently be resistant to *Helicoverpa armigera*, *Anticarsia gemmatilis*, *Sesamia nonagrioides*, *S. inferens*, *Chilo suppressalis*, *C. partellus*, *Scirpophaga incertulas*, *S. innotata*, *Cnaphalocrocis*

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medinalis, *Marasmia patnalis*, *M. exigua*, and *M. ruralis*. Datla et al teach that the mannopine synthase promoter is a wound-inducible promoter (Table 1).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a), which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al (US Patent 6,593,293, filed September 1999) in view of Meulewaeter et al (US 6,294,711, filed June 1997).

The claim is drawn to a chimeric gene construct comprising the CaMV 35S promoter, the *Petunia chlorophyll a/b* leader sequence, and a DNA encoding SEQ ID NO:2.

The teachings of Baum et al are discussed above. Baum et al do not disclose a chimeric gene construct comprising the *Petunia chlorophyll a/b* leader sequence.

Meulewaeter et al teach a chimeric gene construct comprising the CaMV 35S promoter, the *Petunia chlorophyll a/b* leader sequence and a DNA encoding a Cry protein (column 39, lines 49-62).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the chimeric gene construct taught by Baum et al, to use the *Petunia chlorophyll a/b* leader sequence as described in Meulewaeter et al. One of ordinary skill in the

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art would have been motivated to do so because selection of a particular untranslated leader sequence is an obvious design choice.

20. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al in view of Meulewaeter et al as applied to claim 71 above, and further in view of Corbin et al (US 6,489,542, filed November 1998).

The claim is drawn to a chimeric gene construct comprising the CaMV 35S promoter, the Petunia chlorophyll a/b leader sequence, a DNA encoding SEQ ID NO:2 and a DNA encoding the TpssuAt transit peptide.

The teachings of Baum et al in view of Meulewaeter et al are discussed above. Baum et al in view of Meulewaeter et al do not disclose use of DNA encoding the TpssuAt transit peptide in the construct.

Corbin et al teach a DNA encoding the TpssuAt transit peptide operably linked in constructs encoding a Cry protein (column 47, lines 11-37).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the chimeric gene construct taught by Baum et al in view of Meulewaeter et al, to use the DNA encoding the TpssuAt transit peptide as described in Corbin et al. One of ordinary skill in the art would have been motivated to do so because selection of a particular DNA encoding a transit peptide is an obvious design choice.

21. Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al in view of Meulewaeter et al as applied to claim 71 above, and further in view of Mettler et al (US Patent 6,114,608, filed March 1998).

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The claim is drawn to a chimeric gene construct comprising the CaMV 35S promoter, the *Petunia chlorophyll a/b* leader sequence, a DNA encoding SEQ ID NO:2, and the CaMV 3' termination and polyadenylation region.

The teachings of Baum et al in view of Meulewaeter et al are discussed above. Baum et al in view of Meulewaeter et al do not disclose use of the CaMV 3' termination and polyadenylation region in the construct.

Mettler et al teach the CaMV 3' termination and polyadenylation region operably linked in constructs encoding a Cry protein (column 8, lines 11-17).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the chimeric gene construct taught by Baum et al in view of Meulewaeter et al, to use the CaMV 3' termination and polyadenylation region as described in Mettler et al. One of ordinary skill in the art would have been motivated to do so because selection of a particular termination and polyadenylation region is an obvious design choice.

22. Claims 75 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al (US Patent 6,593,293, filed September 1999) in view of Malvar et al (US 6,156,573, filed November 1996).

The claims are drawn to cotton plants transformed with a chimeric gene encoding SEQ ID NO:2 and a chimeric gene encoding aCry1A-Cry1F hybrid protein.

The teachings of Baum et al are discussed above. Baum et al do not disclose cotton plants also transformed with a chimeric gene encoding aCry1A-Cry1F hybrid protein.

Malvar et al teach plants transformed with chimeric gene encoding aCry1A-Cry1F hybrid protein and a second DNA encoding a Cry protein (column 8, lines 55-67).

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At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the method of producing pest-resistant plants taught by Baum et al, to also transform the plants with the chimeric gene encoding aCry1A-Cry1F hybrid described in Malvar et al. One of ordinary skill in the art would have been motivated to do so because selection of a particular second toxin-encoding chimeric gene is an obvious design choice.

Conclusion

23. No claim is allowed.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson, can be reached at (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Customer Service at (703) 308-0198.

Anne R. Kubelik, Ph.D.
February 20, 2004



**ANNE KUBELIK
PATENT EXAMINER**